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ABSTRACT

A study identified the competencies needed by full-time employees entering the apple production industry. Other objectives of the study included: (1) identification of differences among competency areas needed for employees working for large, medium, and small growers (based on acreage); and (2) identification of differences among competency areas needed by employees working for growers with fresh market, processing market, or a combination of marketing outlets. One hundred fourteen Adams County, Pennsylvania, apple growers rated 210 competency statements, resulting in 195 of those statements being rated 3.0 or higher. Regardless of the size of the operation, growers were in agreement on their ratings of competencies for entry-level employment of 18 of 21 competency areas. Furthermore, principal market outlet was not a factor in the growers' ratings of 20 of the 21 competencies involved. Recommendations included using the project-developed survey instrument in competency assessments with other fruit tree growers and using the results of the study in developing instruction for vocational agriculture students preparing to enter the apple production industry. The survey instrument is appended. (MN)

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FINAL REPORT

COMPETENCIES NEEDED BY FULL-TIME EMPLOYEES TO ENTER THE APPLE PRODUCTION INDUSTRY

Contract Number 83-2001

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June 30, 1982

Pennsylvania Department of Education
Bureau of Vocational Education
Research Coordinating Unit for Vocational Education

CE 033 846

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This report is submitted as the final summation for the mini-grant contract number 83-2001, Pennsylvania Department of Education, Bureau of Vocational Education. The study was conducted through the Department of Agricultural and Extension Education, The Pennsylvania State University, as a research study for a Master's Thesis entitled "Competencies Needed by Full-Time Employees Entering the Apple Production Industry in Adams County, Pennsylvania."

The contributions of the following vocational agriculture teachers and apple growers must be recognized for their time in conducting a face validity on the survey instrument: Mr. Paul Benchoff, Mr. Barry Oswald, Mr. Thomas Oyler, Mr. David Teets, Mr. John White, Mr. Dwight Mickey, Mr. Glenn Slaybaugh, Jr., Mr. Richard Slaybaugh, Mr. Myles Starner, and Mr. Donald Weaner. Special recognition must be given to Mr. Donald Weaner and Mr. Richard Slaybaugh, apple growers, for their help in development of the survey instrument, and revising the apple growers mailing list.

Those who served on the thesis committee were: Dr. James H. Mortensen, Associate Professor of Agricultural Education and thesis advisor; Dr. Edgar P. Yoder, Assistant Professor of Agricultural Education; Dr. Ronald R. Daniels, Associate Professor of Environmental Horticulture; and Dr. Richard F. Stinson, Professor of Agricultural Education and Horticulture.

George William Hamilton

INTRODUCTION

Abstract

83-2001: Competencies Needed by Full-Time Employees to Enter the Apple Production Industry

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The purpose of this study was to identify the competencies needed by full-time employees entering the apple production industry.

Objectives

1. To develop and validate a competency list for full-time employees entering the apple production industry.
2. To identify differences among competency areas needed for full-time employees working for large, medium, and small growers (based on acreage).
3. To identify differences among competency areas needed for full-time employees working for growers with fresh market, processing market, or a combination of marketing outlets.

Outcomes

1. Two hundred ten competency statements were rated by Adams County apple growers, resulting in 195 of those competency statements being rated 3.0 or higher.
2. Regardless of the size of the operation, growers were in agreement on their rating of competencies for entry level employment of 18 of 21 competency areas.

3. Regardless of principal market outlet, growers were in agreement on their ratings of competence for entry level employment for 20 of 21 competency areas.
4. There was no difference between the responses obtained through the mail (62 growers) and responses obtained through personal interview (9 growers) on 20 of 21 competency areas.
5. The results of this study are presently being implemented into the instruction for vocational agricultural students studying apple production in a Pennsylvania school district.

Audience

The results of this study are beneficial to vocational agriculture teachers, fruit growers, apple production employees and future employees, and vocational agricultural curriculum developers and teacher educators.

Published Materials

Final Report

Report to Adams County Apple Growers

The content of an agriculture program should be developed around the technical competencies and skills needed by workers in the employment area of the secondary school. Therefore, a high school vocational agriculture program in an apple producing area should be teaching technical competencies needed by employees entering the apple producing industry. McClay (1978) identified and validated essential agriculture competencies needed for entry and advancement in major agriculture and agribusiness occupations. In his study, McClay identified and validated essential skills needed for the tree fruit grower in general. In order for a teacher to use McClay's list of competencies for teaching apple production, the teacher needs to expand the list of competencies and validate them with local apple producers.

Pennsylvania ranks fourth in apple production in the United States; Adams County is the leading apple producing county in Pennsylvania with 45.5 percent of the state production in 1980 (Pennsylvania Department of Agriculture, 1981:67). Therefore, the incorporation of apple production competencies in the local vocational agriculture program is justified from an economic aspect. Preparing students for careers in apple production reflects the career opportunities available to Adams County graduates.

Currently, there is no validated list of apple production competencies for Pennsylvania. There is a recent list of competencies for the orchardist (Mercer, 1981) that includes some general competencies for apple production. However, Mercer's study does not address the specific competency areas in apple production needed by personnel in the industry. This

study provides a detailed listing of technical competencies that may be included in any course of study dealing with apple production. It will be of particular importance in the apple producing areas of Pennsylvania and the United States.

With the apple producers rating the competencies needed by entry level employees, the results can be used to identify a core of essential competencies in apple production. Instructors teaching apple production can base their instruction and instructional materials on the ranked competencies. This identification of a core of competencies is especially important if time allotted for teaching apple production is limited.

The design for the study was a descriptive survey. As such, it did not have an experimental design. The population for the study consisted of all apple producers listed on the 1978 Apple Referendum list for Adams County, Pennsylvania. It was found that of the 123 growers, nine were inaccessible due to death, selling of operation, or removal of apple orchard. A census of 114 apple growers was taken.

Operational Definitions

Competency--The successful performance of a task(s) through the application of behavioral characteristics of knowledge, skills, attitudes, and judgement generally required for the total attitudes, knowledge, and skills which enable one to perform a given function efficiently (modified from McClay's definition, 1978:7).

Task or Sub-Competency--A unit of work activity or operation that constitutes a logical and necessary step in the performance of a competency (McClay, 1978:8).

Apple Grower--A person having 500 or more producing apple trees.

Small Size Apple Grower--Apple grower having less than 40 acres of producing apple orchard.

Medium Size Apple Grower--Apple grower having 40 through 150 acres of producing apple orchard.

Large Size Apple Grower--Apple grower or company having over 150 acres of producing apple orchard.

Fresh Market Apple Grower--Apple grower that markets more than 50 percent of the crop through fresh market outlets.

Processing Market Apple Grower--Apple grower that markets more than 70 percent of the crop through processing outlets.

Apple Grower with a Combination of Market Outlets (Fresh and Processing Markets)--Apple grower that markets 50 to 70 percent of the crop to processing markets and 30 to 50 percent of the apples to fresh market outlets.

METHODS

Purpose of the Study

The purpose of this study was to identify the competencies needed by full-time employees entering the apple production industry. Additionally, the study identified differences among competencies needed for full-time employees working for:

1. Large, medium, and small growers (based on acreage);
2. Growers with fresh market, processing market, or a combination of marketing outlets.

Hypotheses

In order to accomplish the purpose of the study, the following hypotheses were developed and tested:

1. Large apple growers will rate the importance level of the competencies higher than will small or medium sized growers.
2. Producers with fresh market outlets will rate the importance level of the competencies higher than will producers with processing outlets.

Specific Question to be Answered

The following question, which did not lend itself to a hypothesis format, addressed the other aspect of the study: Which competencies are classified as (1) absolutely essential, (2) requiring above average

competence, (3) requiring average competence, (4) requiring little competence, or (5) requiring no competence, by growers for the entry level employees in the apple production industry.

Design of Study

The design for the study was a descriptive survey. As such, it did not have an experimental design. The collection and analysis of data format is shown in Figure 3.

Population

The population for the study consisted of all apple producers in Adams County, Pennsylvania. The names and addresses were obtained from the updated list for the 1978 Apple Referendum (Appendix A), and thus the population is limited to individuals identified on that list. A complete census of the population was taken. The 1978 Apple Referendum list has 123 apple producers. Upon review of the list and collection of the survey instrument, nine producers were inaccessible due to selling of their operation to another established operator, death of the individual, or removal of the apple orchard. Therefore, the accessible population for the study was 114 apple producers in Adams County, Pennsylvania.

Instrumentation

An instrument (Appendix B) was developed to obtain basic background information regarding respondents' operation and the ratings for the technical apple production competencies. The respondents were asked to rate the competencies using the following scale: 5 = absolutely essential,

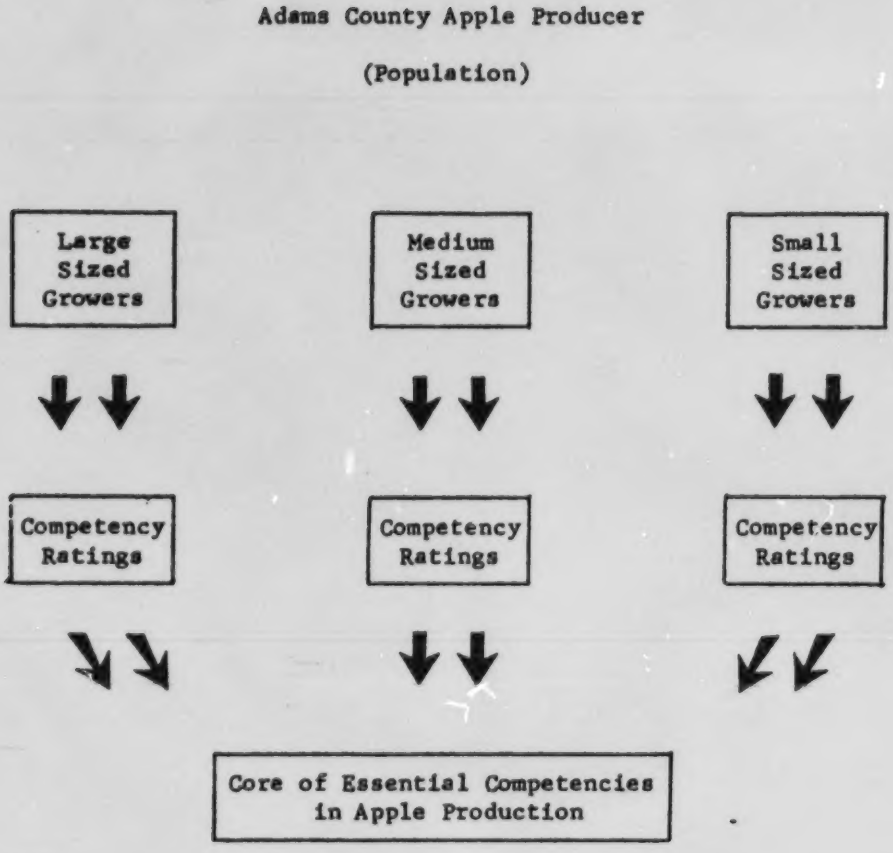

Figure 1. Flow Chart of the Study.

4 = requiring above average competence, 3 = requiring average competence, 2 = requiring little competence, and 1 = requiring no competence.

The competencies were obtained from the McClay (1978) study, and from the V-TECS Orchardist study by Mercer (1981). The investigator then revised the list of competencies and the list was reviewed by five apple producers and five vocational agriculture teachers who had taught apple production, in order to establish a face validity. The final instrument contained 210 competency statements in 21 categories.

Data Collection

The survey instrument was mailed to all Adams County apple growers with a cover letter (Appendix C) and self-addressed, stamped envelope for its return. One month later a follow-up letter (Appendix D) and survey instrument were mailed to non-respondents. Approximately two months after the second mailing, a random sampling of non-respondents (9, 17.9%) was selected and interviewed. The results of follow-up interviews of non-respondents were compared with the mail survey results. A t test was used to test data. No significant differences were found for 20 of the 21 competency areas. A difference was found between the mail survey group and the interview group for the area "spraying." Results from the mail survey and personal interview survey were combined for analysis. Generalizations were made cautiously for the area of spraying. Table 1 illustrates the scope of the study. Seventy-one usable responses were obtained.

Table 1. Scope of Study.

	Number	Percent
Usable Responses		62.3
Mail Survey	62	
Interview	9	
Non-usable Responses		0.9
Mail Survey	1	
Non-respondents	42	36.8
Total	114	100.0

Statistical Analysis

Information from completed survey forms was transferred to data process cards for analysis. Data were analyzed using the ANOVES and SPSS canned computer programs. A t test was conducted on each competency area which compared the mailed and interviewed growers' responses. Analysis of variance was used to test for differences in means among the subgroups. Scheffe's post hoc analysis test was used to examine where differences occurred. Basic descriptive statistics of means, frequencies and standard deviations were also utilized. Multiple choice distribution analysis was used to calculate the mean and standard deviation for each individual competency statement.

ANALYSIS

This study sought to identify the competencies needed by full-time employees entering the apple production industry. The study examined differences among competencies for various size operations (small, medium and large) and marketing outlets (fresh, processing, or combination of fresh and processing).

Presentation of Data

Hypothesis 1--Large apple growers will rate the importance level of the competencies higher than will small or medium sized growers--was rejected for all 21 competency areas. Analysis of variance was used to test the data. For those competency areas showing significant difference, the Scheffe test was run to determine which grower group scores were significantly different.

The mean scores of the three groups of growers and grand mean are shown in Table 2. Only three of the 21 competency areas were rated significantly different. A fourth area, "pollination and fruit set," was found to be significantly different by ANOVA. However, no significant difference was found between or among the groups when the data were analyzed with the Scheffe test. Where significant differences existed the smaller operators rated the competencies higher than the other two groups. Stated positively, the three groups of growers were in agreement regarding the level of importance for 18 of the 21 competency areas.

Hypothesis 2--Producers with fresh market outlets will rate the importance level of the competencies higher than will producers with processing outlets--was rejected for all 21 competency areas. The three groups of producers were in agreement on their ratings of 20 of 21 competency areas as indicated in Table 3. One competency showing a significant difference, "controlling weeds," was analyzed using the Scheffe test to determine which operators were significantly different. Producers with fresh market outlets rated this competency area lower than the producers with processing market outlets and the producers with combination (fresh and processing) market outlets.

The primary purpose of this study was to identify the competencies needed by full-time employees entering the apple production industry. Tables 4 through 24 display the competencies rated by 71 Adams County apple growers listed by grand means within each competency area, presented in the order of the original questionnaire. Table 25 is a combination of all the competencies listed in Tables 4 through 24 with the competencies listed in descending order of importance. Of the 210 competencies included in the survey, 195 were rated 3.0 (average competence) or higher.

Table 2. Growers' Perceptions of Competence for Entry Level Employment by Farming Operation Size. (N=71)

Competence Area	Grand $\bar{X}$	s	Small (n=25) Rank	$\bar{X}$	s	Medium (n=30) Rank	$\bar{X}$	s	Large (n=15) Rank	$\bar{X}$	s
Develop good work habits and attitudes	3.99	0.98	(6)	3.84	1.28	(2)	3.91	0.72	(1)	4.41	0.65
Farm power and equipment	3.99	0.66	(2)	3.97	0.72	(1)	3.92	0.64	(2)	4.18	0.56
Controlling disease	3.86	0.73	(1)	3.99	0.84	(3)	3.89	0.62	(7)	3.58	0.71
Spraying	3.85	0.71	(3)	3.93	0.83	(4)	3.79	0.66	(3)	3.83	0.63
Controlling weeds	3.81	0.78	(7)	3.84	0.86	(5)	3.77	0.80	(4)	3.81	0.65
Controlling insects	3.73	0.78	(5)	3.87	0.84	(6)	3.71	0.73	(9T)	3.53	0.76
Pruning and training	3.71	0.71	(8)	3.76	0.83	(7)	3.63	0.68	(5)	3.75	0.58
Fumigation	3.63	0.93	(4)	3.87	0.92	(9)	3.43	1.07	(6)	3.60	0.51
Harvesting and storage	3.50	0.63	(12T)	3.69	0.71	(12)	3.32	0.63	(9T)	3.53	0.34
Vertebrate control	3.49	0.76	(10)	3.69	0.78	(13)	3.28	0.78	(8)	3.55	0.69
Fertilization	3.46	0.86	(15)	3.53	0.92	(8)	3.45	0.91	(12)	3.30	0.68
Pollination and fruit set	3.42	0.67	(12T)	3.69*A	0.78	(14)	3.27*A	0.61	(13)	3.26*A	0.43
Field planting	3.40	0.77	(16)	3.51	0.76	(10)	3.36	0.84	(11)	3.31	0.67
Construction and maintenance of needed facilities	3.33	1.04	(14)	3.69*A	1.15	(15)	3.22*AB	0.96	(19)	2.95*B	0.93
Management	3.31	1.10	(18)	3.46	1.11	(11)	3.32	1.03	(18)	3.01	1.19
Marketing	3.29	0.94	(9)	3.72*A	0.84	(18)	3.02*B	0.92	(15)	3.06*AB	0.90
Selection of variety	3.22	1.22	(19)	3.45	1.23	(16)	3.13	1.18	(17)	3.01	1.30
Selection and preparation of site	3.17	0.81	(17)	3.46	0.76	(19)	2.98	0.76	(14)	3.07	0.90
Selection of rootstock	3.14	1.23	(20)	3.31	1.15	(17)	3.05	1.20	(16)	3.03	1.45
Propagation	3.01	1.33	(11)	3.69*A	1.32	(21)	2.72*AB	1.20	(21)	2.44*B	1.21
Irrigation	2.98	0.97	(21)	3.14	1.13	(20)	2.88	0.97	(20)	2.94	0.65

*$p < .05$ by analysis of variance. Means followed by the same letters are not significantly different from each other by the Scheffe test.

Table 3. Growers' Perceptions of Competence for Entry Level Employment by Principal Market Outlet. (N=71)

Competence Area	Grand $\bar{X}$	s	Fresh Market (n=7)			Processing Market (n=47)			Combination (n=17)		
			Rank	$\bar{X}$	s	Rank	$\bar{X}$	s	Rank	$\bar{X}$	s
Develop good work habits and attitudes	3.99	0.98	(4)	3.56	0.86	(1)	3.93	1.03	(2)	4.29	0.81
Farm power and equipment	3.99	0.66	(1)	3.74	0.58	(2)	3.91	0.67	(1)	4.31	0.55
Controlling disease	3.86	0.73	(2)	3.71	0.62	(3)	3.90	0.78	(6)	3.80	0.67
Spraying	3.85	1.03	(7T)	3.49	1.11	(4)	3.86	1.03	(4)	3.97	0.93
Controlling weeds	3.81	0.78	(17)	3.14*A	0.95	(5)	3.83*AB	0.75	(3)	4.01*B	0.68
Controlling insects	3.73	0.78	(3)	3.60	0.51	(6)	3.77	0.80	(9)	3.69	0.85
Pruning and training	3.71	0.71	(5)	3.54	0.45	(8)	3.64	0.78	(5)	3.95	0.55
Fumigation	3.63	0.93	(21)	3.01	1.30	(7)	3.66	0.93	(7)	3.79	0.70
Harvesting and storage	3.50	0.63	(6)	3.53	0.43	(9)	3.49	0.73	(12)	3.31	0.36
Vertebrate control	3.49	0.77	(19T)	3.10	0.32	(10)	3.47	0.83	(8)	3.71	0.66
Fertilization	3.46	0.86	(12)	3.36	0.48	(11)	3.44	0.93	(11)	3.55	0.81
Pollination and fruit set	3.42	0.67	(11)	3.39	0.29	(12)	3.42	0.74	(13)	3.44	0.60
Field planting	3.40	0.77	(19T)	3.10	0.60	(15)	3.36	0.78	(10)	3.66	0.77
Construction and maintenance of needed facilities	3.33	1.04	(9)	3.46	0.80	(14)	3.38	1.05	(17)	3.13	1.11
Management	3.31	1.09	(10)	3.43	0.83	(13)	3.41	1.11	(18)	2.97	1.10
Marketing	3.29	0.94	(15)	3.20	1.03	(17)	3.29	0.97	(14)	3.32	0.85
Selection of variety	3.22	1.22	(18)	3.13	0.90	(16)	3.33	1.18	(19)	2.95	1.44
Selection and preparation of site	3.17	0.81	(16)	3.16	0.42	(19)	3.16	0.77	(15T)	3.22	1.04
Selection of rootstock	3.14	1.23	(7T)	3.49	0.73	(18)	3.20	1.17	(20)	2.84	1.52
Propagation	3.01	1.33	(13)	3.23	0.64	(20)	3.16	1.39	(21)	2.50	1.24
Irrigation	2.98	0.97	(14)	3.21	0.18	(21)	2.86	1.04	(15T)	3.22	0.89

*$p < .05$ by analysis of variance. Means followed by the same letters are not significantly different from each other by the Scheffe test.

Table 4. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Selection of Variety" for Entry Employment.

Competency	$\bar{X}$	s
1. Select appropriate varieties of apple trees for specific purpose.	3.34	1.38
2. Select appropriate pollination varieties.	3.30	1.28
3. Select varieties of apple trees adapted to the soil and climate of the area.	3.18	1.32
4. Select disease resistant varieties for given area.	2.99	1.29

Table 5. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Selection of Rootstocks" for Entry Employment.

Competency	$\bar{X}$	s
1. Choose trees on rootstocks adapted to the area.	3.30	1.37
2. Select rootstocks that are compatible to the scion variety.	3.24	1.49
3. Select rootstock that will produce the wanted size of apple tree.	3.18	1.32
4. Specify rootstocks for the apple tree to be planted.	3.01	1.27
5. Select disease resistant rootstocks for given area.	2.94	1.30

Table 6. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Propagation" for Entry Employment.

Competency	$\bar{X}$	s.
1. Identify the different types of buds (vegetative and fruit).	3.32	1.43
2. Select healthy budding and/or graft plant materials.	3.19	1.43
3. Bridge graft trees for mechanical and rodent repairs.	3.09	1.34
4. Bud seedling apple tree of appropriate variety and rootstock.	2.93	1.54
5. Make clefts and in-lay bark grafts (top working).	2.90	1.41
6. Bench graft (whip or tongue method) apple tree of appropriate variety and rootstock.	2.83	1.46
7. Select appropriate grafting materials and tools.	2.80	1.34

Table 7. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Selection and Preparation of Site" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Prepare the soil for planting apple trees.	3.62	1.11
2.	Add nutrients to soil according to soil test in best method to prevent nutrient loss.	3.51	1.07
3.	Fumigate proposed site for nematode, disease, etc. that are harmful to apple trees.	3.51	1.24
4.	Prepare the site for planting trees (excavation, level, etc.).	3.41	1.11
5.	Select sites which have air drainage and areas where frost damage is not a limiting factor in production.	3.25	1.40
6.	Soil test proposed sites for nutrients.	3.23	1.18
7.	Select sites having adequate water drainage.	3.13	1.32
8.	Add organic matter to the soil where needed	3.01	1.00
9.	Select sites that have a deep top soil.	2.86	1.18
10.	Select sites that are free from wind swept areas.	2.70	1.23
11.	Select sites having adequate water for irrigation.	2.65	1.06

Table 8. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Field Planting" for Entry Employment.

Competency	$\bar{X}$	s.
1. Plant trees the proper soil depth and distance to a given rootstock and/or variety with proper planting equipment (hole digger, tree transplanter, etc.).	4.01	1.04
2. Plant trees in the orchard according to plan.	3.83	0.96
3. Layout the orchard for greatest efficiency in production and maintenance.	3.77	1.22
4. Minimize erosion in newly planted orchard.	3.56	1.03
5. Use appropriate starter solutions on newly planted apple trees where recommended.	3.15	1.11
6. Water newly planted trees.	2.83	1.28
7. Mulch newly planted trees where the practice is recommended.	2.66	1.15

Table 9. Means and Standard Deviations of the Operators' Rating of Competence in the Areas of "Pruning and Training" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Prune trees to establish scaffold branches.	4.27	0.84
2.	Identify and perform the different methods of pruning and training of apple trees.	4.23	0.83
3.	Prune newly planted trees.	4.20	1.03
4.	Select and use appropriate systems of training for different sizes and types of apple trees.	4.06	0.93
5.	Identify fruit and vegetative buds, age of spurs, and age of fruiting wood.	4.00	0.90
6.	Prune tree to encourage optimum color of fruit.	3.79	1.04
7.	Prune trees to avoid parallel branches and/or cross branches occupying the same space.	3.76	1.03
8.	Identify and be able to use different types of pruning equipment.	3.68	1.07
9.	Use limb spreaders to make tree limb crotches stronger and cause earlier fruiting.	3.61	1.08
10.	Prune trees to remove dead and/or diseased branches.	3.48	1.30
11.	Operate a mechanical prune machine (tree topping).	3.31	1.35
12.	Prune trees for mechanical harvesting.	3.13	1.23
13.	Apply wound protection.	2.83	1.26

Table 10. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Fertilization" for Entry Employment.

Competency	$\bar{X}$	s
1. Apply a fertilizer to the soil by means of mechanical applicators (cyclone, liquid, etc.).	3.69	1.17
2. Make foliar application of plant nutrients to orchard trees.	3.69	1.12
3. Adjust fertilizer to provide optimum quality of fruit.	3.51	1.16
4. Prepare material for foliar feeding.	3.51	1.29
5. Specify fertilizer application for the site from the soil test.	3.48	1.19
6. Take appropriate leaf tissue samples for nutrient testing and quantitative analysis.	3.48	1.09
7. Take appropriate soil samples for nutrient and pH testing in established orchards.	3.46	1.03
8. Adjust nitrogen level for trees by the growth of new wood each year.	3.45	1.22
9. Specify application of lime for the site from the soil test.	3.30	1.26
10. Apply fertilizer to trees by means of irrigation water.	3.04	1.45

Table 11. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Irrigation" for Entry Employment.

Competency	$\bar{X}$	s
1. Apply irrigation water according to specifications and soil-climate conditions.	3.26	1.22
2. Develop a specified irrigation system under supervision.	3.26	1.13
3. Set up and move irrigation pipe according to given instructions.	3.04	1.39
4. Prepare soil to receive irrigation water.	2.86	0.95
5. Make moisture tests of soil to determine need for irrigation.	2.81	1.19
6. Keep daily evaporation records to determine need for irrigation.	2.67	1.12

Table 12. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Fumigation" for Entry Employment.

Competency	$\bar{X}$	s
1. Read and comply with manufacturer's label directions and legal requirements affecting recommended fumigate application, timing, and safety.	3.92	1.14
2. Calibrate fumigate applicators.	3.92	1.20
3. Interpret and follow chemical label directions for fumigate storing, mixing, and handling.	3.90	1.13
4. Operate fumigate applicators and apply fumigates properly and safely.	3.83	1.20
5. Meet state requirements for fumigate's use and application.	3.39	1.26
6. Properly cover soil after application of fumigates.	3.28	1.19
7. Select a recommended fumigate in terms of expected costs and returns.	3.13	1.36

Table 13. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Controlling Disease" for Entry Employment.

Competency	$\bar{X}$	s
1. Interpret and follow chemical label directions for fungicide storing, mixing, and handling.	4.06	0.93
2. Identify diseases and interpret their effect on the apple crop.	4.03	1.10
3. Identify dangers of chemicals carry-over of fungicide residues in soil and application equipment.	4.03	0.95
4. Meet state requirements for fungicide use and application.	3.97	0.98
5. Read and comply with manufacturer's label directions and legal requirements affecting recommended fungicide application, timing, and safety.	3.97	0.99
6. Identify and appraise the performance of recommended fungicide.	3.90	1.10
7. Identify the method by which diseases are spread.	3.77	1.09
8. Select a recommended disease control program in terms of expected costs and returns.	3.48	1.25
9. Evaluate environmental impact of disease control program.	3.41	1.26

Table 14. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Controlling Insects" for Entry Employment.

Competency	$\bar{X}$	s
1. Know and identify dangers of insecticide residue carry-over on the fruit, environment, and in application equipment.	4.07	0.95
2. Meet state requirements for use of E.P.A. designated "Restricted Pesticide" and other non-restricted pesticide.	3.96	1.02
3. Read and comply with manufacturer's label directions and legal requirements affecting recommended insecticide application, timing, and safety.	3.90	0.98
4. Store, mix, and handle recommended insecticide conforming to manufacturer's label directions.	3.90	0.97
5. Detect insect infestation.	3.83	0.90
6. Identify and evaluate damage caused by insects.	3.80	0.99
7. Identify and distinguish between harmful and beneficial insects.	3.76	1.07
8. Evaluate life cycle of insects to determine appropriate control procedures.	3.63	1.27
9. Select the best insect control program in terms of economic costs, returns, and environmental impact.	3.63	1.43
10. Use of natural predators to control harmful insects.	3.59	1.21
11. Identify methods and sources by which insects are spread.	3.56	1.08
12. Appraise performance of recommended insecticides.	3.45	1.10
13. Use attractants and/or traps to anticipate a rise in insect population so that spraying could begin.	3.30	1.21

Table 15. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Controlling Weeds" for Entry Employment.

Competency	$\bar{X}$	s
1. Apply weed control chemicals correctly and safely.	4.11	1.00
2. Perform field adjustment and minor field repairs on weed control equipment and power sources.	4.00	0.96
3. Operate mechanical weed control equipment and power sources safely.	3.97	0.95
4. Read and comply with manufacturer's label directions and legal requirements affecting recommended herbicide application, timing, and safety.	3.97	1.05
5. Store, mix, and handle herbicides conforming to manufacturer's label directions.	3.89	1.03
6. Meet state requirements for herbicide use and application.	3.87	1.03
7. Recognize dangers of carry-over of herbicide residues in the soil and in application equipment.	3.80	1.02
8. Identify common weeds.	3.37	0.97
9. Recognize weed infestation problems and select the best method of control.	3.27	1.14

Table 16. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Spraying" for Entry Employment.

Competency	$\bar{X}$	s
1. Calibrate herbicide or insecticide and fungicide sprayers.	4.17	1.09
2. Operate sprayer equipment and power sources safely.	4.08	0.87
3. Realize the importance and be able to read the label of a pesticide container.	4.06	1.02
4. Perform field adjustments and minor field repairs on sprayers and power sources.	4.00	0.77
5. Identify "spray injury" on fruit and trees, and be able to prevent spray injury in future.	3.87	0.90
6. Realize that there is no smoking, no chewing, and/or no eating while spraying and working with pesticides.	3.86	1.20
7. Winterize sprayer for storage.	3.83	1.07
8. Clean and disinfect sprayer equipment.	3.80	1.00
9. Determine if different pesticides are compatible and mix different types of pesticides safely.	3.80	1.04
10. Select and wear protective clothing while working with pesticides.	3.77	1.06
11. Dispose of empty chemical containers in a safe manner as stated on pesticide label.	3.73	1.10
12. Keep systematic spray records.	3.70	0.97
13. Protect wounds on trees or young trees from possible damage by certain pesticide sprays.	3.15	1.00

Table 17. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Vertebrate Control" for Entry Employment.

Competency	$\bar{X}$	s
1. Control and/or prevent vertebrate damages in the orchard.	3.58	0.93
2. Repair damages caused by vertebrate pests in the orchard.	3.48	0.90
3. Identify and evaluate damage caused by vertebrate pests (deer, rabbits, rodents, birds, etc.).	3.39	0.97

Table 18. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Harvesting and Storage" for Entry Employment.

Competency	$\bar{X}$	s
1. Instruct pickers so bruise-free fruit is harvest.	4.01	0.91
2. Use handling machinery (forklifts, bulk bins, etc.).	3.90	0.92
3. Know and practice safety in harvesting fruit.	3.80	1.10
4. Harvest apples by appropriate methods.	3.63	1.04
5. Determine optimum time to harvest fruit crop.	3.55	1.15
6. Operate grading and/or sorting machines and other various packing-processing machines (washers, waxer, scales, boxers).	3.49	1.14
7. Use harvesting aids (platforms, squirrels, etc.).	3.41	0.99
8. Sort harvested fruits into recognized grade requirements and standards.	3.35	1.01
9. Determine the most appropriate method for harvesting fruit.	3.34	1.11
10. Set up cool storage room and/or control atmosphere room.	3.28	1.46
11. Store apples in a cool storage room and/or control atmosphere room.	3.15	1.32
12. Use a pressure tester to determine optimum harvest time.	3.03	1.11

Table 19. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Pollination and Fruit Set" for Entry Employment.

Competency	$\bar{X}$	s
1. Thin fruit by chemical control sprays.	4.20	0.85
2. Assure pollination by the choice of varieties and proper placing of pollinizer trees.	3.62	1.11
3. Thin fruit by mechanical methods.	3.39	1.11
4. Assure adequate pollination by use of bees.	3.27	1.05
5. Thin fruit by hand.	3.04	1.29
6. Pollinate blossoms by bringing pollen to the trees to be pollinated.	3.01	1.20

Table 20. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Management" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Keep accounts of fruit enterprises which will provide information needed for income tax reports.	3.49	1.35
2.	Adjust inputs (labor, machinery, fertilizer, chemicals, etc.) based on relative costs and anticipated returns.	3.46	1.39
3.	Compare costs in relation to production with acceptable standards (labor costs per acre, production per acre, return per man, etc.).	3.44	1.33
4.	Determine outlets offering best returns for fruits from the farm.	3.44	1.26
5.	Determine production performance of each fruit enterprise in relation to acceptable standards.	3.39	1.28
6.	Use fruit farm management analysis to determine profitability of the business.	3.37	1.35
7.	Have a general knowledge of and obey government regulations.	3.35	1.08
8.	Identify outlets for fruit products off the farm.	3.33	1.25
9.	Determine labor supply and number of employees needed.	3.32	1.15
10.	Keep accounts which allow comparison of performance with farms reported by Cooperative Extension Service or other business analysis services.	3.31	1.37
11.	Use fruit farm management analysis to determine cash flow in the business.	3.29	1.37
12.	Use farm management analysis to determine appropriate credit terms.	3.28	1.35
13.	Determine the most economical source of supply.	3.27	1.21

Table 20. Continued.

Competency	$\bar{X}$	s
14. Use farm management analysis of fruit farms to determine uses of credit.	3.26	1.37
15. Adjust the fruit farming program based on reports from reliable sources.	3.14	1.33
16. Identify government agencies with regulations pertaining to the apple production industry.	3.08	1.22
17. Identify sources of supplies for fruit production.	3.04	1.12

Table 21. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Marketing" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Know characteristics of different apple varieties and know the varieties' different uses.	3.61	1.05
2.	Label varieties of fruit.	3.54	1.11
3.	Suggest varieties of fruit to meet needs of the customer.	3.42	1.21
4.	Grade fruit to meet government standards for retail sale.	3.39	1.13
5.	Plan the layout for a roadside fruit market.	3.34	1.47
6.	Meet customers in the farm market and determine their needs and desires.	3.31	1.19
7.	Maintain safe practices among customers for a "pick-your-own" marketing program.	3.28	1.18
8.	Display fruit for retail sale.	3.27	1.20
9.	Plan a "pick-your-own" marketing scheme for tree fruits.	3.24	1.37
10.	Prepare fruit for the roadside market.	3.24	1.19
11.	Package fruit for retail sale.	3.18	1.12
12.	Determine method of selling fruit crop.	3.14	1.32
13.	Select necessary equipment and supplies needed for specific roadside market facility.	3.09	1.34
14.	Plan access and exit for the roadside fruit market area.	3.08	1.25
15.	Weigh or measure amount of fruit purchased by "pick-your-own" customers.	3.07	1.09
16.	Lay out driveways and parking space for a roadside market.	3.06	1.32

Table 22. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Farm Power and Equipment" for Entry Employment.

Competency	$\bar{X}$	s
1. Operate equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	4.21	0.82
2. Operate carefully the tractors and other power units commonly found on tree fruit farms of the area.	4.10	0.95
3. Diagnose malfunctioning equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage and processing equipment commonly used in the area).	4.10	0.80
4. Perform minor maintenance and service operations on the fuel systems (gas and diesel) of the power units commonly found on the tree fruit farms of the area in accordance with the operator's manual.	4.07	0.79
5. Adjust the equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	4.04	0.78
6. Check operation and performance maintenance operations on hydraulic systems of machines commonly found on tree fruit farms of the area as specified in the operator's manual.	4.04	0.80
7. Operate all power units and all types of apple production equipment according to safety rules and regulation of each tool.	4.03	0.91
8. Identify, replace and/or repair defective parts on equipment used on tree fruit farms of the area (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage and processing equipment).	4.01	0.82

Table 22. Continued.

Competency	$\bar{X}$	s
9. Read and interpret operator's manual for power units and all types of apple production equipment.	4.00	0.97
10. Lubricate, change oil and filters, and service air cleaners on power units commonly found on tree fruit farms of the area as specified in the operator's manual.	3.97	0.95
11. Diagnose malfunctioning of the power units commonly found on tree fruit farms of the area (belts, chains, gears, hoses, seals, gears, brakes, shafts, etc.).	3.97	0.84
12. Perform minor maintenance and service operations on ignition systems (gas and diesel) of the power units commonly found on tree fruit farms of the area in accordance with the operator's manual (spark plugs, battery, points, condensor, timing, etc.).	3.94	0.79
13. Perform minor maintenance and service operations on cooling systems of the power units commonly used on tree fruit farms of the area in accordance with the operator's manual.	3.87	0.79
14. Prepare all equipment for storage according to common practices and/or owner's manual.	3.84	0.84
15. Maintain and service tires on machines commonly found on tree fruit farms of the area as specified in the operator's manual.	3.70	0.97

Table 23. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Construction and Maintenance of Needed Facilities" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Install 110-volt electric wiring.	3.44	1.42
2.	Construct and repair wood bin, wood pallets, wood boxes, etc.	3.40	1.14
3.	Construct an equipment and/or storage shed.	3.31	1.21
4.	Construct cooler room and/or control atmosphere room.	3.27	1.60
5.	Construct a packing shed.	3.21	1.49

Table 24. Means and Standard Deviations of the Operators' Rating of Competence in the Area of "Develop Good Work Habits and Attitudes" for Entry Employment.

	Competency	$\bar{X}$	s
1.	Exhibit honesty and personal integrity.	4.29	0.92
2.	See and anticipate the next task(s) which will contribute to success of the operation.	4.21	0.72
3.	Advise management and other workers about exixting safety hazards and work to correct them.	4.11	0.82
4.	Follow directions.	4.10	0.96
5.	Exhibit courtesy in dealing with customers and employer.	4.07	0.88
6.	Accept and carry out responsibility.	4.07	0.93
7.	Follow employer's policies and procedures.	4.06	0.88
8.	Be dependable and thorough in completing work.	4.06	0.94
9.	Exhibit initiative for job.	4.03	0.83
10.	Accept and profit from constructive criticism.	4.03	0.94
11.	Be willing to learn.	4.00	1.13
12.	Perform work assignments to the best of ability.	3.99	1.03
13.	Exhibit harmonious working relationship with co-workers.	3.97	0.99
14.	Show a positive attitude toward job.	3.96	0.98
15.	Follow safety procedures and policies.	3.94	1.01
16.	Be loyal to the employer.	3.91	1.14
17.	Be willing to work overtime when needed.	3.91	1.02
18.	Have enthusiasm for job.	3.90	0.99
19.	Be flexible to change.	3.90	1.02

Table 24. Continued.

Competency	$\bar{X}$	s
20. Be punctual.	3.89	1.15
21. Regular attendance.	3.86	1.23
22. Be clean, neat, and well-groomed in appearance.	3.61	1.04

Table 25. Growers' Perceptions of Competence for Entry Level Employment in Descending Order of Importance. (n=71)

Competency	$\bar{X}$	s.d.
Exhibit honesty and personal integrity	4.29	0.92
Prune trees to establish scaffold branches	4.27	0.84
Identify and perform the different methods of pruning and training of apple trees	4.23	0.83
Operate equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	4.21	0.82
See and anticipate the next task(s) which will contribute to success of the operation	4.21	0.72
Thin fruit by chemical control sprays	4.20	0.85
Prune newly planted trees	4.20	1.03
Calibrate herbicide or insecticide and fungicide sprayers	4.17	1.09
Apply weed control chemicals correctly and safely.	4.11	1.00
Advise management and other workers about existing safety hazards and work to correct them.	4.11	0.82
Follow directions.	4.10	0.96
Operate carefully the tractors and other power units commonly found on tree fruit farms of the area.	4.10	0.95
Diagnose malfunctioning equipment used on tree fruit farms (including tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage and processing equipment commonly used in the area).	4.10	0.80
Operate sprayer equipment and power sources safely.	4.08	0.87
Perform minor maintenance and service operations on the fuel systems (gas and diesel) of the power units commonly found on the tree fruit farms of the area in accordance with the operator's manual.	4.07	0.79

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Know and identify dangers of insecticide residue carry-over on the fruit, environment, and in application equipment.	4.07	0.95
Exhibit courtesy in dealing with customers and employer.	4.07	0.88
Accept and carry out responsibility.	4.07	0.93
Follow employer's policies and procedures.	4.06	0.88
Be dependable and thorough in completing work.	4.06	0.94
Select and use appropriate systems of training for different sizes and types of apple trees.	4.06	0.93
Interpret and follow chemical label directions for fungicide storing, mixing, and handling.	4.06	0.93
Realize the importance and be able to read the label of a pesticide container.	4.06	1.02
Adjust the equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	4.04	0.78
Check operation and performance maintenance operations on hydraulic systems of machines commonly found on tree fruit farms of the area as specified in the operator's manual.	4.04	0.80
Operate all power units and all types of apple production equipment according to safety rules and regulation of each tool.	4.03	0.91
Identify diseases and interpret their effect on the apple crop.	4.03	1.10
Identify dangers of chemicals carry-over of fungicide residues in soil and application equipment.	4.03	0.95
Exhibit initiative for job.	4.03	0.83
Accept and profit from constructive criticism.	4.03	0.94

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Plant trees the proper soil depth and distance to a given rootstock and/or variety with proper planting equipment (hole digger, tree transplanter, etc.).	4.01	1.04
Instruct pickers so bruise-free fruit is harvest.	4.01	0.91
Identify, replace and/or repair defective parts on equipment used on tree fruit farms of the area (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage and process equipment).	4.01	0.82
Perform field adjustments and minor field repairs on sprayers and power sources.	4.00	0.77
Identify fruit and vetetable buds, age of spurs, and age of fruiting wood.	4.00	0.90
Perform field adjustment and minor field repairs on weed control equipment and power sources.	4.00	0.96
Read and interpret operator's manual for power units and all types of apple production equipment.	4.00	0.97
Be willing to learn.	4.00	1.13
Perform work assignments to the best of ability.	3.99	1.03
Exhibit harmonious working relationship with co-workers.	3.97	0.99
Lubricate, change oil and filters, and service air cleaners on power units commonly found on tree fruit farms of the area as specified in the operator's manual.	3.97	0.95
Diagnose malfunctioning of the power units commonly found on tree fruit farms of the area (belts, chains, gears, hoses, seals, brakes, shafts, etc.).	3.97	0.84
Meet state requirements for fungicide use and application.	3.97	0.98
Read and comply with manufacturer's label directions and legal requirements affecting recommended fungicide application, timing, and safety.	3.97	0.99
Operate mechanical weed control equipment and power sources safely.	3.97	0.95

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Read and comply with manufacturer's label directions and legal requirements affecting recommended herbicide application, timing, and safety.	3.97	1.05
Meet state requirements for use of E.P.A. designated "Restricted Pesticide" and other non-restricted pesticide.	3.96	1.02
Show a positive attitude toward job.	3.96	0.98
Follow safety procedures and policies.	3.94	1.01
Perform minor maintenance and service operations on ignition systems (gas and diesel) of the power units commonly found on tree fruit farms of the area in accordance with the operator's manual (spark plugs, battery, points, condensor, timing, etc.).	3.94	0.79
Read and comply with manufacturer's label directions and legal requirements affecting recommended fumigate application, timing, and safety.	3.92	1.14
Calibrate fumigate applicators.	3.92	1.20
Be loyal to the employer.	3.91	1.14
Be willing to work overtime when needed.	3.91	1.02
Have enthusiasm for job.	3.90	0.99
Be flexible to change.	3.90	1.02
Use handling machinery (forklifts, bulk bins, etc.).	3.90	0.92
Read and comply with manufacturer's label directions and legal requirements affecting recommended insecticide application, timing, and safety.	3.90	0.98
Store, mix, and handle recommended insecticide conforming to manufacturer's label directions.	3.90	0.97
Interpret and follow chemical label directions for fumigate storing, mixing, and handling.	3.90	1.13
Identify and appraise the performance of recommended fungicide.	3.90	1.10

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Store, mix, and handle herbicides conforming to manufacturer's label directions.	3.89	1.03
Be punctual.	3.89	1.15
Perform minor maintenance and service operations on cooling systems of the power units commonly used on tree fruit farms of the area in accordance with the operator's manual.	3.87	0.79
Meet state requirements for herbicide use and application.	3.87	1.03
Identify "spray injury" on fruit and trees, and be able to prevent spray injury in future.	3.87	0.90
Realize that there is no smoking, no chewing, and/or no eating while spraying and working with pesticides.	3.86	1.20
Regular attendance.	3.86	1.23
Prepare all equipment for storage according to common practices and/or owner's manual.	3.84	0.84
Plant trees in the orchard according to plan.	3.83	0.96
Detect insect infestation.	3.83	0.90
Operate fumigate applicators and apply fumigates properly and safely.	3.83	1.20
Winterize sprayer for storage.	3.83	1.00
Clean and disinfect sprayer equipment.	3.80	1.00
Determine if different pesticides are compatible and mix different types of pesticides safely.	3.80	1.04
Recognize dangers of carry-over of herbicide residues in the soil and in application equipment.	3.80	1.02
Identify and evaluate damage caused by insects.	3.80	0.99
Know and practice safety in harvesting fruit.	3.80	1.10
Prune tree to encourage optimum color of fruit.	3.79	1.04

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Select and wear protective clothing while working with pesticides.	3.77	1.06
Identify the method by which diseases are spread.	3.77	1.09
Layout the orchard for greatest efficiency in production and maintenance.	3.77	1.22
Identify and distinguish between harmful and beneficial insects.	3.76	1.07
Prune trees to avoid parallel branches and/or cross branches occupying the same space.	3.76	1.03
Dispose of empty chemical containers in a safe manner as stated on pesticide label.	3.73	1.10
Keep systematic spray records.	3.70	0.97
Maintain and service tires on machines commonly found on tree fruit farms of the area as specified in the operator's manual.	3.70	0.97
Apply a fertilizer to the soil by means of mechanical applicators (cyclone, liquid, etc.).	3.69	1.17
Make foliar application of plant nutrients to orchard trees.	3.69	1.12
Identify and be able to use different types of pruning equipment.	3.68	1.07
Evaluate life cycle of insects to determine appropriate control procedures.	3.63	1.27
Select the best insect control program in terms of economic costs, returns, and environmental impact.	3.63	1.43
Harvest apples by appropriate methods.	3.63	1.04
Assure pollination by the choice of varieties and proper placing of pollinizer trees.	3.62	1.11
Prepare the soil for planting apple trees.	3.62	1.11
Know characteristics of different apple varieties and know the varieties' different uses.	3.61	1.05

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Use limb spreaders to make tree limb crotches stronger and cause earlier fruiting.	3.61	1.08
Be clean, neat, and well-groomed in appearance.	3.61	1.04
Use of natural predators to control harmful insects.	3.59	1.21
Control and/or prevent vertebrate damages in the orchard.	3.58	0.93
Identify methods and sources by which insects are spread.	3.56	1.08
Minimize erosion in newly planted orchard.	3.56	1.03
Determine optimum time to harvest fruit crop.	3.55	1.15
Label varieties of fruit.	3.54	1.11
Add nutrients to soil according to soil test in best method to prevent nutrient loss.	3.51	1.07
Fumigate proposed site for nematode, disease, etc. that are harmful to apple trees.	3.51	1.24
Adjust fertilizer to provide optimum quality of fruit.	3.51	1.16
Prepare material for foliar feeding.	3.51	1.29
Operate grading and/or sorting machines and other various packing-processing machines (washers, waxer, scales, boxers).	3.49	1.14
Keep accounts of fruit enterprises which will provide information needed for income tax reports.	3.49	1.35
Repair damages caused by vertebrate pests in the orchard.	3.48	0.90
Prune trees to remove dead and/or diseased branches.	3.48	1.30
Select a recommended disease control program in terms of expected costs and returns.	3.48	1.25
Specify fertilizer application for the site from the soil test.	3.48	1.19

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Take appropriate leaf tissue samples for nutrient testing and quantitative analysis.	3.48	1.09
Take appropriate soil samples for nutrient and pH testing in established orchards.	3.46	1.03
Adjust inputs (labor, machinery, fertilizer, chemicals, etc.) based on relative costs and anticipated returns.	3.46	1.39
Adjust nitrogen level for trees by the growth of new wood each year.	3.45	1.22
Appraise performance of recommended insecticides.	3.45	1.10
Install 110-volt electric wiring.	3.44	1.42
Compare costs in relation to production with acceptable standards (labor costs per acre, production per acre, return per man, etc.).	3.44	1.33
Determine outlets offering best returns for fruits from the farm.	3.44	1.26
Suggest varieties of fruit to meet needs of the customer.	3.42	1.21
Prepare the site for planting trees (excavation, level, etc.).	3.41	1.11
Use harvesting aids (platforms, squirrels, etc.).	3.41	0.99
Evaluate environmental impact of disease control program.	3.41	1.26
Construct and repair wood bin, wood pallets, wood boxes, etc.	3.40	1.14
Identify and evaluate damage caused by vertebrate bests (deer, rabbits, rodents, birds, etc.).	3.39	0.97
Grade fruit to meet government standards for retail sale.	3.39	1.13
Meet state requirements for fumigate's use and application.	3.39	1.26
Thin fruit by mechanical methods.	3.39	1.11

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Determine production performance of each fruit enterprise in relation to acceptable standards.	3.39	1.28
Use fruit farm management analysis to determine profitability of the business.	3.37	1.35
Identify common weeds.	3.37	0.97
Have a general knowledge of and obey government regulations.	3.35	1.08
Sort harvested fruits into recognized grade requirements and standards.	3.35	1.01
Determine the most appropriate method for harvesting fruit.	3.34	1.11
Plan the layout for a roadside fruit market.	3.34	1.47
Select appropriate varieties of apple trees for specific purpose.	3.34	1.38
Identify outlets for fruit products off the farm.	3.33	1.25
Determine labor supply and number of employees needed.	3.32	1.15
Identify the different types of buds (vegetative and fruit).	3.32	1.43
Keep accounts which allow comparison of performance with farms reported by Cooperative Extension Service or other business analysis services.	3.31	1.37
Construct an equipment and/or storage shed.	3.31	1.21
Meet customers in the farm market and determine their needs and desires.	3.31	1.19
Operate a mechanical prune machine (tree topping).	3.31	1.35
Select appropriate pollination varieties.	3.30	1.28
Choose trees on rootstocks adapted to the area.	3.30	1.37
Specify application of lime for the site from the soil test.	3.30	1.26

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Use attractants and/or traps to anticipate a rise in insect population so that spraying could begin.	3.30	1.21
Use fruit farm management analysis to determine cash flow in the business.	3.29	1.37
Use farm management analysis to determine appropriate credit terms.	3.28	1.35
Maintain safe practices among customers for a "pick-your-own" marketing program.	3.28	1.18
Set up cool storage room and/or control atmosphere room.	3.28	1.46
Properly cover soil after application of fumigates.	3.28	1.19
Determine the most economical source of supply.	3.27	1.21
Recognize weed infestation problems and select the best method of control.	3.27	1.14
Construct cooler room and/or control atmosphere room.	3.27	1.60
Assure adequate pollination by use of bees.	3.27	1.05
Display fruit for retail sale.	3.27	1.20
Apply irrigation water according to specifications and soil-climate conditions	3.26	1.22
Develop a specified irrigation system under supervision.	3.26	1.13
Use farm management analysis of fruit farms to determine uses of credit.	3.26	1.37
Select sites which have air drainage and areas where frost damage is not a limiting factor in production.	3.25	1.40
Plan a "pick-your-own" marketing scheme for tree fruits.	3.24	1.37
Prepare fruit for the roadside market.	3.24	1.19
Select rootstocks that are compatible to the scion variety.	3.24	1.49

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Soil test proposed sites for nutrients.	3.23	1.18
Construct a packing shed.	3.21	1.49
Select healthy budding and/or graft plant materials.	3.19	1.43
Select rootstock that will produce the wanted size of apple tree.	3.18	1.32
Select varieties of apple trees adapted to the soil and climate of the area.	3.18	1.32
Package fruit for retail sale.	3.18	1.12
Protect wounds on trees or young trees from possible damage by certain pesticide sprays.	3.15	1.00
Use appropriate starter solutions on newly planted apple trees where recommended.	3.15	1.11
Store apples in a cool storage room and/or control atmosphere room.	3.15	1.32
Determine method of selling fruit crop.	3.14	1.32
Adjust the fruit farming program based on reports from reliable sources.	3.14	1.33
Select sites having adequate water drainage.	3.13	1.32
Select a recommended fumigate in terms of expected costs and returns.	3.13	1.36
Prune trees for mechanical harvesting.	3.13	1.23
Bridge graft trees for mechanical and rodent repairs.	3.09	1.34
Select necessary equipment and supplies needed for specific roadside market facility.	3.09	1.34
Plan access and exit for the roadside fruit market area.	3.08	1.25
Identify government agencies with regulations pertaining to the apple production industry.	3.08	1.22
Weigh or measure amount of fruit purchased by "pick-your-own" customers.	3.07	1.09

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Lay out driveways and parking space for a roadside market.	3.06	1.32
Identify sources of supplies for fruit production.	3.04	1.12
Apply fertilizer to trees by means of irrigation water.	3.04	1.45
Thin fruit by hand.	3.04	1.29
Set up and move irrigation pipe according to given instructions.	3.04	1.39
Use a pressure tester to determine optimum harvest time.	3.03	1.11
Add organic matter to the soil where needed.	3.01	1.00
Pollinate blossoms by bringing pollen to the trees to be pollinated.	3.01	1.20
Specify rootstocks for the apple tree to be planted.	3.01	1.27
Select disease resistant varieties for given area.	2.99	1.29
Select disease resistant rootstocks for given area.	2.94	1.30
Bud seedling apple tree of appropriate variety and rootstock.	2.93	1.54
Make clefts and in-lay bark grafts (top working).	2.90	1.41
Select sites that have a deep top soil.	2.86	1.18
Prepare soil to receive irrigation water.	2.86	0.95
Apply wound protection.	2.83	1.26
Water newly planted trees.	2.83	1.28
Bench graft (whip or tongue method) apple tree of appropriate variety and rootstock.	2.83	1.46
Select appropriate grafting materials and tools.	2.80	1.34
Make moisture tests of soil to determine need for irrigation.	2.81	1.19

Table 25. Continued.

Competency	$\bar{X}$	s.d.
Select sites that are free from wind swept areas.	2.70	1.23
Keep daily evaporation records to determine need for irrigation.	2.67	1.12
Mulch newly planted trees where the practice is recommended.	2.66	1.15
Select sites having adequate water for irrigation.	2.65	1.06

Although the growers cited "develop good work habits and attitudes" and "farm power and equipment" competency areas most highly overall, their responses on nearly all of the competencies in which an entry-level employee might be expected to be involved were "average" or above regardless of size or marketing outlet, therefore indicating a preference on the growers' part for hiring employees who could demonstrate the greatest range and degree of competence in a broad range of categories.

Some of the competencies included on the instrument for this study were also included on the instrument utilized by McClay (1981). To a much lesser extent, some of the same competencies were similar to those in the instrument utilized by Mercer (1981). Comparison between the results of the Mercer study and this one were difficult. This study dealt with three competency areas that were not included in the Mercer study: marketing, management, and work habits and attitudes. Mercer had five general statements for pesticides; this study had four competency areas (spraying, fumigation, control insects, and control diseases) with a total of 42 competency statements. However, the Mercer study provided an extensive review of the farm power and equipment area.

Similarities exist between the ratings of the competencies within competency areas between this study and the McClay study. Twelve of the competency areas identified in the McClay study had very similar ratings in this study. In this study, competencies identified in the competency area of marketing were rated higher than in the McClay study. The McClay study did not involve an evaluation of competencies related to controlling weeds, fumigation, and construction and maintenance of needed facilities. Additionally, several of the competencies identified by McClay were

integrated into one or more competency areas in this study. An example: in the McClay study the competencies found in disease and insect control were redistributed into four different competency areas (controlling disease, controlling insects, spraying, and vertebrate control) in this study.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Hypothesis 1 was rejected for all 21 competency areas. Regardless of the size of operation, growers were in agreement on their ratings of competence for entry level employment for 18 of 21 competency areas.
2. Hypothesis 2 was rejected for all 21 competency areas. Regardless of principal market outlet, growers were in agreement on their ratings of competence for entry level employment for 20 of 21 competency areas.
3. One hundred ninety-five of 210 competency statements were rated 3.0 (average) or higher by apple growers.
4. There was no difference between the responses obtained through the mail and responses obtained through personal interview on 20 of 21 competency areas.

Recommendations

Based upon the experiences gained from this study, it is recommended that:

1. The survey instrument developed in this study be used in competency assessments with other tree fruit (peach, pear).
2. The results of this study be used in developing instruction for vocational agriculture students studying apple production for entry level employment.

3. Because of numerous and additional competencies identified, curriculum developers use other resources in addition to the V-TECS catalog for identifying course content.
4. Research be done to compare ratings of employees and employers regarding the importance of each competency for entry-level employment in the apple production industry.

DISSEMINATION

Published texts are on file in Pattee Library and in the Department of Agricultural and Extension Education, The Pennsylvania State University. An abstract of the study has been submitted for publication in "Abstracts of Research Studies in Agricultural Education 1981-1982." This will be published in September 1982 by the Department of Agricultural and Extension Education, The Pennsylvania State University. Nationally, an abstract was submitted for publication in "Summary of Research and Developmental Activities in Agricultural Education 1981-82." The publication date of this summary will be December 1982. The editor of the publication is Dr. Joe W. Kotrlik, Louisiana State University, Baton Rouge.

A final report of this study is being submitted to the ERIC system. Also, the final report will be submitted to the Bureau of Vocational Education, Pennsylvania Department of Education. Additionally, an abstract will be submitted for program consideration for the Eastern Region Agricultural Education Research Conference at Rutgers University, May 1983.

Articles will be submitted for consideration for publication in "Science in Agriculture" at The Pennsylvania State University, and in the "Pennsylvania Fruit Grower" magazine.

Finally, a copy of Growers' Perceptions of Competence for Entry Level Employment was mailed to all apple growers who completed the survey, and to vocational agriculture departments located in the school districts in Adams County.

SUPPLEMENTARY MATERIALS

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APPENDIX A

1978 APPLE REFERENDUM LIST OF ADAMS COUNTY APPLE GROWERS

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
001	Adams Co. Nursery & Fruit Farm Mr. John Baugher, Sr. Aspers, PA 17304	2/8		3/17	4/5		X			
002	Mr. J. Kenneth Biesecker Orrtanna, PA 17353	2/8		3/17						X
003	Mr. Roy Black R. D. 1 Biglerville, PA 17307	2/8		3/17	4/1		X			
004	Bream Orchards, Inc. R. D. Ortanna, PA 17353	2/8		3/17					X	
005	Mr. William Brent Fairfield, PA 17320	2/8		3/17					X	
006	Mr. Wendell Brough Aspers, PA 17304	2/8		3/17					X	
007	Buchers Farm Cashtown, PA 17310	2/8		3/17					X	
008	Blaine D. & Warren C. Bushey R. D. 2 Biglerville, PA 17307	2/8		3/17					X	
009	Mr. Dean L. Carey Franklin St. Biglerville, PA 17307	2/8		3/17	3/22		X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Inter-view date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respon-dent	inacce sibl
010	Mr. H. Cashman R. D. 1 York Springs, PA 17372	2/8		3/17					X	
011	Mr. Ralph Clapsaddle R. D. 1 Orrtanna, PA 17353	2/8	2/14							X
012	Mr. John G. Cluck Biglerville, PA 17307	2/8		3/17					X	
013	Cole Brothers Biglerville, PA 17307	2/8		3/17					X	
014	Adams Co. Winery Mr. Ronald F. Cooper Route 1 Orrtanna, PA 17353	2/8	2/15					X		
015	Mr. Kermit Deardorff Cashtown, PA 17310	2/8	2/22				X			
016	Mr. John M. Diehl R. D. 1 Fairfield, PA 17320	2/8		3/17	3/25		X			
017	Mr. J. Donald Dillon Orrtanna, PA 17353	2/8		3/17		5/29	X			
018	Mr. Gary Dively R. D. 1 Biglerville, PA 17307	2/8	2/25				X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
019	Mr. Eddie Dively R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
020	Mr. Guy F. Donaldson R. D. 3 Gettysburg, PA 17325	2/8	2/22				X			
021	E. Vista Orchards R. D. 1 Fairfield, PA 17320	2/8		3/17	3/25		X			
022	Mr. Clair D. Fetters Box 50 Gardners, PA 17324	2/8	3/12				X			
023	Mr. Paul Fetters R. D. 2 Gardners, PA 17324	2/8		3/17					X	
024	Fruit Research Lab Dr. George Green Biglerville, PA 17307	This operation is totally research oriented; therefore, it was eliminated for this study.								
025	Mountain-Dale Farms Sterling Funt R. D. 1 Biglerville, PA 17307	2/8	2/17				X			
026	C. R. Garretson R. D. 1 Biglerville, PA 17307	2/8	2/19				X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inacce sibl
027	Garretson Orchards, Inc. Bendersville, PA 17306	2/8		3/17	3/23		X			
028	Group Orchards, Inc. R. D. 1 Gardners, PA 17324	2/8		3/17						
029	Mr. William R. Hale Box 155 Arendtsville, PA 17303	2/8	2/24				X			
030	T/A Hall Bros. H.A. and P.W. Hall R. D. 2 Orrtanna, PA 17353	2/8	3/2				X			
031	Mr. Steven Showers R. D. 1 Gardners, PA 17324	2/8		3/17					X	
032	Mr. Charles A. Heller Gardners, PA 17324	2/8		3/17						X
033	Hollabaugh Brothers R. D. 1 Biglerville, PA 17307	2/8		3/17	3/22		X			
034	Mr. Justin J. Horick R. D. 1 Aspers, PA 17304	2/8		3/17					X	
035	Hutton Orchards, Inc. R. D. 6 Gettysburg, PA 17325	2/8		3/17					X	

ID No.	Apple Grower Address	First Mailing		Second Mailing		Inter-view date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respon-dent	inacces sible
036	Patrick & Paul Irvin Orrtanna, PA 17353	2/8		3/17					X	
037	Kenneth & Harold Kane Kane Brothers Orrtanna, PA 17353	2/8	2/23				X			
038	Atlee L. Keefer York Springs, PA 17372	2/8	3/4				X			
039	Esther R. Keefer York Springs, PA 17372	2/8		3/17					X	
040	Mr. Clarence Ketterman R. D. 2 Biglerville, PA 17307	2/8		3/17	3/23		X			
041	Mr. Glenn F. Kime R. D. 1 Gardners, PA 17324	2/8		3/17	3/22		X			
042	Mr. Robert Kime R. D. 1 Aspers, PA 17304	2/8		3/17	4/2		X			
043	Mr. Clair Knouse Biglerville, PA 17307	2/8		3/17	3/24		X			
044	Knouse Fruitlands, Inc. Box 243 Arendtsville, PA 17303	2/8		3/17					X	

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
045	Kuhn Orchards R. D. 1 Orrtanna, PA 17353	2/8	3/9				X			
046	Mr. Herbert P. Lady R. D. 2 Biglerville, PA 17307	2/8		3/17	3/24		X			
047	Mr. William Kump R. D. 1 Orrtanna, PA 17353	2/8		3/17					X	
048	Fremont Kuntz R. D. 1 Gardners, PA 17324	2/8		3/17					X	
049	Rice & Kuntz Orchards Bendersville, PA 17306	2/8		3/17						X
050	Robert Lentz Orrtanna, PA 17353	2/8		3/17	3/25		X			
051	Mr. Paul B. Lerew York Springs, PA 17372	2/8		3/17					X	
052	Round Barn Orchard John S. Linn R. D. 2 Biglerville, PA 17307	2/8		3/17		5/29	X			
053	Mr. Donald Heckenluber R. D. 1 Biglerville, PA 17307	2/8		3/17					X	

ID No.	Apple Grower Address	First Mailing		Second Mailing		Inter-view date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respon-dent	inacces sible
054	Mr. Charles Lory York Springs, PA 17372	2/8		3/17					X	
055	Mac Lott R. D. 1 Gardners, PA 17324	2/8	2/17				X			
056	R. C. Lott Aspers, PA 17304	2/8		3/17	3/26		X			
057	Mr. Robert Lott, Jr. R. D. 1 Biglerville, PA 17307	2/8		3/17		5/29	X			
058	Bonnie Brae Farms William M. Lott R. D. 1 Gardners, PA 17324	2/8		3/17						X
059	Boyer Nurseries & Orchard, Inc. William Boyer Lower R. D. 2 Biglerville, PA 17307	2/8	2/19				X			
060	Mr. Stuart A. Lucabaugh R. D. 5 Hanove , PA 17331	2/8	2/16				X			
061	Mr. Orville McBeth R. D. 1 Biglerville, PA 17307	2/8		3/17		5/29	X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
062	Mr. Harry E. McDannel R. D. 2 Biglerville, PA 17307	2/8	2/26				X			
063	Mr. William R. McLeaf Fairfield, PA 17320	2/8	2/16				X			
064	Mr. Robert K. Mauss R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
065	Mrs. Hope Morgan P. O. Cashtown, PA 17310	2/8								X
066	Musselman Fruit Products Division PET, Inc. Biglerville, PA 17307	2/8	2/18				X			
067	Ivan Musselman Orchards, Inc. Orrtanna, PA 17353	2/8	2/23				X			
068	Mr. Ronald L. Myers R. D. 1 Biglerville, PA 17307	2/8	3/9				X			
069	Dr. James R. Oyler R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
070	Mr. Thomas O. Oyler, Sr. R. D. 3 Gettysburg, PA 17325	2/8		3/17		5/30	X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
071	Dan Pak Orchards York Springs, PA 17372	2/8		3/17					X	
072	Apple-Valley Orchards Philip A. Roth R. D. 1 Fairfield, PA 17320	2/8	2/16				X			
073	Mr. Raymond Pepple Orrtanna, PA 17353	2/8		3/17					X	
074	Mr. John B. Peters, Inc. R. D. 1 Gardners, PA 17325	2/8	2/19				X			
075	Pitzer Brothers Fruit Farm R. D. 1 Gardners, PA 17325	2/8	2/23				X			
076	Eugene Pitzer Biglerville, PA 17307	2/8		3/17					X	
077	Mr. Paul G. Pitzer R. D. 1 Biglerville, PA 17307	2/8	2/23				X			
078	Mr. Richard L. Pitzer R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
079	Mr. Donald C. Rice R. D. 2 Gardners, PA 17324	2/8		3/17	4/9		X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
080	Mr. Harold C. Rice R. D. 2 Gardners, PA 17324	2/8		3/17					X	
081	Rice and Rice Biglerville, PA 17307	2/8	2/24				X			
082	Ronald F. Rice R. D. 1 Biglerville, PA 17307	2/8		3/17		5/29	X			
083	Rand L. Orchard Co. R. D. 1 Gardners, PA 17324	2/8	2/18				X			
084	Mr. Paul Robinson R. D. 2 Biglerville, PA 17307	2/8	3/2				X			
085	Routsong Brothers Bendersville, PA 17306	2/8		3/17					X	
086	Mr. Ralph S. Sandoe R. D. 1 Biglerville, PA 17307	2/8	3/4				X			
087	P. H. Schindel R. D. 1 Orrtanna, PA 17353	2/8		3/17					X	
088	Elliot Schlosser Arendtsville, PA 17303	2/8								X

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
089	Mr. Howard Schriver Gardners, PA 17324	2/8	2/17				X			
090	Mr. James D.Schulteis R. D. 1 Biglerville, PA 17307	2/8		3/17	4/1		X			
091	Mr. Wilmer Sharrah R. D. 2 Biglerville, PA 17307	2/8		3/17	3/23		X			
092	Terry J. Scheaffer R. D. 1 Biglerville, PA 17307	2/8		3/17		5/28	X			
093	Clair Showers R. D. 1 Aspers, PA 17304	2/8		3/17					X	
094	Grayson Showers Bendersville, PA 17306	2/8		3/17					X	
095	Anthony Showers Route 2, Box 482C Gardners, PA 17324	2/8		3/17					X	
096	Mr. Glenn Slaybaugh, Jr. R. D. 2 Biglerville, PA 17307	2/8	2/16				X			
097	Mr. Steven Slaybaugh R. D. 1 Biglerville, PA 17307	2/8	2/18				X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
098	Mr. Raymond I. Slaybaugh R. D. 1 Aspers, PA 17304	2/8		3/17		5/29	X			
099	Mr. Richard Slaybaugh R. D. 1 Biglerville, PA 17307	2/8	2/18				X			
100	Mr. Clark Spence R. D. 1 Orrtanna, PA 17353	2/8		3/17					X	
101	Laverne E. Starner R. D. 2 Gardners, PA 17304	2/8		3/17	3/30		X			
102	Charlotte Strausbaugh R. D. 1 Orrtanna, PA 17353	2/8	2/23				X			
103	Elizabeth Sullivan R. D. Orrtanna, PA 17353	2/8		3/17	3/24		X			
104	Suncrest Orchards Floyd J. Kump Cashtown, PA 17310	2/8		3/17					X	
105	Leonard L. Tate R. D. 2, Box 122 Gardners, PA 17324	2/8		3/17					X	

ID No.	Apple Grower Address	First Mailing		Second Mailing		Inter-view date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respon-dent	inacces sible
106	Kenneth Taylor R. D. 1 Biglerville, PA 17307	2/8		3/17		5/29	X			
107	Mr. Robert G. Taylor R. D. 1 Biglerville, PA 17307	2/8		3/17	4/7		X			
108	Mr. Rodney C. Taylor R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
109	Mt. View Fruit Farms, Inc. R. D. 1 Biglerville, PA 17307	2/8		3/17	3/23		X			
110	Jesse Tuckey Biglerville, PA 17307	2/8		3/17					X	
111	Ronald Tuckey R. D. 1 Biglerville, PA 17307	2/8		3/17					X	
112	Crestmont Orchards Ralph W. Tyson Gardners, PA 17324	2/8	3/2				X			
113	Donald O. Weaner R. D. 1 Aspers, PA 17304	2/8	2/12				X			
114	Dale Newman R. D. 2 Gettysburg, PA 17325	2/8								X

ID No.	Apple Grower Address	First Mailing		Second Mailing		Inter-view date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respon-dent	inacc sib
115	M. Everett Weiser R. D. 1 York Springs, PA 17372	2/8	2/25				X			
116	Donald G. Wenk R. D. 1 Aspers, PA 17304	2/8	2/12				X			
117	Luther M. Wetzel R. D. 1 Orrtanna, PA 17353	2/8		3/17					X	
118	Maj. Bernard Williams 2151 Hermosa Dri. Fairfax, VA 22030	2/8								X
119	William B. Wilson R. D. 1 Biglerville, PA 17307	2/8	3/10				X			
120	Wayne E. Woerner R. D. 1 Orrtanna, PA 17353	2/8		3/17	3/23		X			
121	Clair Wolf Biglerville, PA 17307	2/8	2/26				X			
122	Harold E. & Wayne L. Wolf York Springs, PA 17372	2/8		3/17					X	
123	Worley's Nurseries Chester B. Worley R. D. 1 York Springs, PA 17372	2/8	2/23				X			

ID No.	Apple Grower Address	First Mailing		Second Mailing		Interview date	Comments			
		date sent	date retnd.	date sent	date retnd.		usable	not usable	non-respondent	inaccessible
124	Myles & Neil Starner R. D. 1 Aspers, PA 17304	2/8		3/17	3/24		X			

APPENDIX B

SURVEY INSTRUMENT

Code No. _____

APPLE PRODUCTION COMPETENCY RATING

Instructions: Rate each statement as you perceive its worth for a full-time worker (employee) in your operation. Circle the number that indicates your perception of how important (necessary) that specific competency is.

5 = Complete competence needed
4 = Above average competence needed
3 = Average competence needed
2 = Little competence needed
1 = No competence needed

Example: Taken from Dairy Production

Competency					
Clip a cow	5	4	(3)	2	1
Artificially inseminate cow	5	4	3	(2)	1
Milk cows	(5)	4	3	2	1

The circled number after each competency identifies the degree of competence needed by a full-time farm hand working on that farm.

START HERE:

Competency Statement					
1. SELECTION OF VARIETY					
A. Select appropriate varieties of apple trees for specific purpose.	5	4	3	2	1
B. Select varieties of apple trees adapted to the soil and climate of the area.	5	4	3	2	1
C. Select disease resistant varieties for given area.	5	4	3	2	1
D. Select appropriate pollination varieties.	5	4	3	2	1
2. SELECTION OF ROOTSTOCK					
A. Choose trees on rootstocks adapted to the area.	5	4	3	2	1
B. Select rootstocks that are compatible to the scion variety.	5	4	3	2	1

2 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

C. Select rootstock that will produce the wanted size of apple tree. 5 4 3 2 1

D. Specify rootstocks for the apple tree to be planted. 5 4 3 2 1

E. Select disease resistant rootstocks for given area. 5 4 3 2 1

3. PROPAGATION

A. Select appropriate grafting materials and tools. 5 4 3 2 1

B. Select healthy budding and/or graft plant materials. 5 4 3 2 1

C. Identify the different types of buds (vegetative and fruit). 5 4 3 2 1

D. Bud seedling apple tree of appropriate variety and rootstock. 5 4 3 2 1

E. Bench graft (whip or tongue method) apple tree of appropriate variety and rootstock. 5 4 3 2 1

F. Make cleft grafts and in-lay bark grafts (top working). 5 4 3 2 1

G. Bridge graft trees for mechanical and rodent repairs. 5 4 3 2 1

4. SELECTION AND PREPARATION OF SITE

A. Select sites which have air drainage and areas where frost damage is not a limiting factor in production. 5 4 3 2 1

B. Select sites having adequate water drainage. 5 4 3 2 1

C. Select sites having adequate water for irrigation. 5 4 3 2 1

D. Select sites that have a deep top soil. 5 4 3 2 1

E. Select sites that are free from wind swept areas. 5 4 3 2 1

F. Soil test proposed sites for nutrients. 5 4 3 2 1

G. Prepare the site for planting trees (excavation, level, etc.). 5 4 3 2 1

H. Prepare the soil for planting apple trees. 5 4 3 2 1

3 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

I. Add nutrients to soil according to soil test in best method to prevent nutrient loss. 5 4 3 2 1

J. Add organic matter to the soil where needed. 5 4 3 2 1

K. Fumigate proposed site for nematode, disease, etc. that are harmful to apple trees. 5 4 3 2 1

5. FIELD PLANTING

A. Layout the orchard for greatest efficiency in production and maintenance. 5 4 3 2 1

B. Plant trees in the orchard according to plan. 5 4 3 2 1

C. Plant trees the proper soil depth and distance to a given rootstock and/or variety with proper planting equipment (hole digger, tree transplanter, etc.). 5 4 3 2 1

D. Use appropriate starter solutions on newly planted apple trees where recommended. 5 4 3 2 1

E. Water newly planted trees. 5 4 3 2 1

F. Minimize erosion in newly planted orchard. 5 4 3 2 1

G. Mulch newly planted trees where the practice is recommended. 5 4 3 2 1

6. PRUNING AND TRAINING

A. Identify and perform the different methods of pruning and training of apple trees. 5 4 3 2 1

B. Identify and be able to use different types of pruning equipment. 5 4 3 2 1

C. Identify fruit and vegetative buds, age of spurs, and age of fruiting wood. 5 4 3 2 1

D. Prune newly planted trees. 5 4 3 2 1

E. Prune trees to establish scaffold branches. 5 4 3 2 1

F. Select and use appropriate systems of training for different sizes and types of apple trees. 5 4 3 2 1

G. Prune trees to remove dead and/or diseased branches. 5 4 3 2 1

H. Use limb spreaders to make tree limb crotches stronger and cause earlier fruiting. 5 4 3 2 1

4 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

I. Prune trees for mechanical harvesting. 5 4 3 2 1

J. Operate a mechanical prune machine (tree topping). 5 4 3 2 1

K. Prune trees to avoid parallel branches and/or cross branches occupying the same space. 5 4 3 2 1

L. Prune tree to encourage optimum color of fruit. 5 4 3 2 1

M. Apply wound protection. 5 4 3 2 1

7. FERTILIZATION

A. Take appropriate soil samples for nutrient and pH testing in established orchards. 5 4 3 2 1

B. Take appropriate leaf tissue samples for nutrient testing and quantitative analysis. 5 4 3 2 1

C. Specify fertilizer application for the site from the soil test. 5 4 3 2 1

D. Specify application of lime for the site from the soil test. 5 4 3 2 1

E. Apply a fertilizer to the soil by means of mechanical applicators (cyclone, liquid, etc.). 5 4 3 2 1

F. Adjust fertilizer to provide optimum quality of fruit. 5 4 3 2 1

G. Make foliar application of plant nutrients to orchard trees. 5 4 3 2 1

H. Prepare material for foliar feeding. 5 4 3 2 1

I. Apply fertilizer to trees by means of irrigation water. 5 4 3 2 1

J. Adjust nitrogen level for trees by the growth of new wood each year. 5 4 3 2 1

8. IRRIGATION

A. Apply irrigation water according to specifications and soil-climate conditions. 5 4 3 2 1

B. Make moisture tests of soil to determine need for irrigation. 5 4 3 2 1

C. Keep daily evaporation records to determine need for irrigation. 5 4 3 2 1

5 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

D. Develop a specified irrigation system under supervision. 5 4 3 2 1

E. Prepare soil to receive irrigation water. 5 4 3 2 1

F. Set up and move irrigation pipe according to given instructions. 5 4 3 2 1

9. FUMIGATION

A. Select a recommended fumigate in terms of expected costs and returns. 5 4 3 2 1

B. Meet state requirements for fumigate's use and application. 5 4 3 2 1

C. Read and comply with manufacturer's label directions and legal requirements affecting recommended fumigate application, timing, and safety. 5 4 3 2 1

D. Interpret and follow chemical label directions for fumigate storing, mixing, and handling. 5 4 3 2 1

E. Calibrate fumigate applicators. 5 4 3 2 1

F. Operate fumigate applicators and apply fumigates properly and safely. 5 4 3 2 1

G. Properly cover soil after application of fumigates. 5 4 3 2 1

10. CONTROLLING DISEASE

A. Identify diseases and interpret their effect on the apple crop. 5 4 3 2 1

B. Identify and appraise the performance of recommended fungicide. 5 4 3 2 1

C. Identify the method by which diseases are spread. 5 4 3 2 1

D. Evaluate environmental impact of disease control program. 5 4 3 2 1

E. Select a recommended disease control program in terms of expected costs and returns. 5 4 3 2 1

F. Meet state requirements for fungicide use and application. 5 4 3 2 1

6 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

G. Read and comply with manufacturer's label directions and legal requirements affecting recommended fungicide application, timing, and safety. 5 4 3 2 1

H. Interpret and follow chemical label directions for fungicide storing, mixing, and handling. 5 4 3 2 1

I. Identify dangers of chemicals carry-over of fungicide residues in soil and application equipment. 5 4 3 2 1

11. CONTROLLING INSECTS

A. Detect insect infestation. 5 4 3 2 1

B. Identify and evaluate damage caused by insects. 5 4 3 2 1

C. Identify methods and sources by which insects are spread. 5 4 3 2 1

D. Identify and distinguish between harmful and beneficial insects. 5 4 3 2 1

E. Evaluate life cycle of insects to determine appropriate control procedures. 5 4 3 2 1

F. Select the best insect control program in terms of economic costs, returns, and environmental impact. 5 4 3 2 1

G. Meet state requirements for use of E.P.A. designated "Restricted Pesticide" and other non-restricted pesticide. 5 4 3 2 1

H. Read and comply with manufacturer's label directions and legal requirements affecting recommended insecticide application, timing, and safety. 5 4 3 2 1

I. Store, mix, and handle recommended insecticide conforming to manufacturer's label directions. 5 4 3 2 1

J. Know and identify dangers of insecticide residue carry-over on the fruit, environment, and in application equipment. 5 4 3 2 1

K. Appraise performance of recommended insecticides. 5 4 3 2 1

L. Use attractants and/or traps to anticipate a rise in insect population so that spraying could begin. 5 4 3 2 1

M. Use of natural predators to control harmful insects. 5 4 3 2 1

7 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

12. CONTROLLING WEEDS

A. Operate mechanical weed control equipment and power sources safely. 5 4 3 2 1

B. Perform field adjustment and minor field repairs on weed control equipment and power sources. 5 4 3 2 1

C. Identify common weeds. 5 4 3 2 1

D. Recognize weed infestation problems and select the best method of control. 5 4 3 2 1

E. Meet state requirements for herbicide use and application. 5 4 3 2 1

F. Read and comply with manufacturer's label directions and legal requirements affecting recommended herbicide application, timing, and safety. 5 4 3 2 1

G. Store, mix, and handle herbicides conforming to manufacturer's label directions. 5 4 3 2 1

H. Apply weed control chemicals correctly and safely. 5 4 3 2 1

I. Recognize dangers of carry-over of herbicide residues in the soil and in application equipment. 5 4 3 2 1

13. SPRAYING

A. Realize the importance and be able to read the label of a pesticide container. 5 4 3 2 1

B. Realize that there is no smoking, no chewing, and/or no eating while spraying and working with pesticides. 5 4 3 2 1

C. Calibrate herbicide or insecticide and fungicide sprayers. 5 4 3 2 1

D. Operate sprayer equipment and power sources safely. 5 4 3 2 1

E. Perform field adjustments and minor field repairs on sprayers and power sources. 5 4 3 2 1

F. Identify "spray injury" on fruit and trees, and be able to prevent spray injury in future. 5 4 3 2 1

8 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

G.	Clean and disinfect sprayer equipment.	5 4 3 2 1
H.	Winterize sprayer for storage.	5 4 3 2 1
I.	Keep systematic spray records.	5 4 3 2 1
J.	Select and wear protective clothing while working with pesticides.	5 4 3 2 1
K.	Protect wounds on trees or young trees from possible damage by certain pesticide sprays.	5 4 3 2 1
L.	Determine if different pesticides are compatible and mix different types of pesticides safely.	5 4 3 2 1
M.	Dispose of empty chemical containers in a safe manner as stated on pesticide label.	5 4 3 2 1

14. VERTEBRATE CONTROL

A.	Identify and evaluate damage caused by vertebrate pests (deer, rabbits, rodents, birds, etc.).	5 4 3 2 1
B.	Control and/or prevent vertebrate damages in the orchard.	5 4 3 2 1
C.	Repair damages caused by vertebrate pests in the orchard.	5 4 3 2 1

15. HARVESTING AND STORAGE

A.	Determine optimum time to harvest fruit crop.	5 4 3 2 1
B.	Determine the most appropriate method for harvesting fruit.	5 4 3 2 1
C.	Harvest apples by appropriate methods.	5 4 3 2 1
D.	Use harvesting aids (platforms, squirrels, etc.).	5 4 3 2 1
E.	Use handling machinery (forklifts, bulk bins, etc.).	5 4 3 2 1
F.	Sort harvested fruits into recognized grade requirements and standards.	5 4 3 2 1
G.	Operate grading and/or sorting machines and other various packing-processing machines (washers, waxer, scales, boxers).	5 4 3 2 1
H.	Use a pressure tester to determine optimum harvest time.	5 4 3 2 1

9 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

I. Know and practice safety in harvesting fruit. 5 4 3 2 1

J. Instruct pickers so bruise free fruit is harvest. 5 4 3 2 1

K. Set up cool storage room and/or control atmosphere room. 5 4 3 2 1

L. Store apples in a cool storage room and/or control atmosphere room. 5 4 3 2 1

16. POLLINATION AND FRUIT SET

A. Assure adequate pollination by use of bees. 5 4 3 2 1

B. Assure pollination by the choise of varieties and proper placing of pollinizer trees. 5 4 3 2 1

C. Pollinate blossoms by bringing pollen to the trees to be pollinated. 5 4 3 2 1

D. Thin fruit by hand. 5 4 3 2 1

E. Thin fruit by mechanical methods. 5 4 3 2 1

F. Thin fruit by chemical control sprays. 5 4 3 2 1

17. MANAGEMENT

A. Keep accounts of fruit enterprises which will provide information needed for income tax reports. 5 4 3 2 1

B. Determine the most economical sources of supply. 5 4 3 2 1

C. Identify outlets for fruit products of the farm. 5 4 3 2 1

D. Compare costs in relation to production with acceptable standards (labor costs per acre, production per acre, return per man, etc.). 5 4 3 2 1

E. Adjust inputs (labor, machinery, fertilizer, chemicals, etc.) based on relative costs and anticipated returns. 5 4 3 2 1

F. Determine production performance of each fruit enterprise in relation to acceptable standards. 5 4 3 2 1

G. Keep accounts which allow comparison of performance with farms reported by Cooperative Extension Service or other business analysis services. 5 4 3 2 1

10 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

H.	Identify sources of supplies for fruit production.	5 4 3 2 1
I.	Determine outlets offering best returns for fruits from the farm.	5 4 3 2 1
J.	Use fruit farm management analysis to determine profitability of the business.	5 4 3 2 1
K.	Use farm management analysis of fruit farms to determine uses of credit.	5 4 3 2 1
L.	Adjust the fruit farming program based on reports from reliable sources.	5 4 3 2 1
M.	Use fruit farm management analysis to determine cash flow in the business.	5 4 3 2 1
N.	Use farm management analysis to determine appropriate credit terms.	5 4 3 2 1
O.	Identify government agencies with regulations pertaining to the apple production industry.	5 4 3 2 1
P.	Have a general knowledge of and obey government regulations.	5 4 3 2 1
Q.	Determine labor supply and number of employees needed.	5 4 3 2 1

18. MARKETING

A.	Label varieties of fruit.	5 4 3 2 1
B.	Know characteristics of different apple varieties and know the varieties' different uses.	5 4 3 2 1
C.	Determine method of selling fruit crop.	5 4 3 2 1
D.	Select necessary equipment and supplies needed for specific roadside market facility.	5 4 3 2 1
E.	Display fruit for retail sale.	5 4 3 2 1
F.	Prepare fruit for the roadside market.	5 4 3 2 1
G.	Grade fruit to meet government standards for retail sale.	5 4 3 2 1
H.	Weigh or measure amount of fruit purchased by "pick-your-own" customers.	5 4 3 2 1
I.	Suggest varieties of fruit to meet needs of the customer.	5 4 3 2 1

11 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

J. Package fruit for retail sale. 5 4 3 2 1

K. Maintain safe practices among customers for a "pick-your-own" marketing program. 5 4 3 2 1

L. Meet customers in the farm market and determine their needs and desires. 5 4 3 2 1

M. Plan a "pick-your-own" marketing scheme for tree fruits. 5 4 3 2 1

N. Plan access and exit for the roadside fruit market area. 5 4 3 2 1

O. Lay out driveways and parking space for a Roadside market. 5 4 3 2 1

P. Plan the layout for a roadside fruit market. 5 4 3 2 1

19. FARM POWER AND EQUIPMENT

A. Operate carefully the tractors and other power units commonly found on tree fruit farms of the area. 5 4 3 2 1

B. Operate equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area). 5 4 3 2 1

C. Lubricate, change oil and filters, and service air cleaners on power units commonly found on tree fruit farms of the area as specified in the operator's manual. 5 4 3 2 1

D. Maintain the service tires on machines commonly found on tree fruit farms of the area as specified in the operator's manual. 5 4 3 2 1

E. Adjust the equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly unsed in the area). 5 4 3 2 1

F. Perform minor maintenance and service operations on the fuel systems (gas and diesel) of the power units commonly found on the tree fruit farms of the area in accordance with the operator's manual. 5 4 3 2 1

12 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

G. Perform minor maintenance and service operations on cooling systems of the power units commonly used on tree fruit farms of the area in accordance with the operator's manual. 5 4 3 2 1

H. Diagnose malfunctioning equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area). 5 4 3 2 1

I. Check operation and performance maintenance operations on hydraulic systems of machines commonly found on tree fruit farms of the area as specified in the operator's manual. 5 4 3 2 1

J. Perform minor maintenance and service operations on ignition systems (gas and diesel) of the power units commonly found on tree fruit farms of the area in accordance with the operator's manual (spark plugs, battery, points, condensor, timing, etc.). 5 4 3 2 1

K. Prepare all equipment for storage according to common practices and/or owner's manual. 5 4 3 2 1

L. Diagnose malfunctioning of the power units commonly found on tree fruit farms of the area (belts, chains, gears, hoses, seals, gears, brakes, shafts, etc.). 5 4 3 2 1

M. Identify, replace and/or repair defective parts on equipment used on tree fruit farms of the area (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment). 5 4 3 2 1

N. Read and interpret operator's manual for power units and all types of apple production equipment. 5 4 3 2 1

O. Operate all power units and all types of apple production equipment according to safety rules and regulation of each tool. 5 4 3 2 1

20. CONSTRUCTION AND MAINTENANCE OF NEEDED FACILITIES

A. Construct an equipment and/or storage shed. 5 4 3 2 1

B. Install 110-volt electric wiring. 5 4 3 2 1

C. Construct and repair wood bin, wood pallets, wood boxes, etc. 5 4 3 2 1

13 5 = Complete competence needed 4 = Above average competence needed
3 = Average competence needed 2 = Little competence needed
1 = No competence needed

D.	Construct cooler room and/or control atmosphere room.	5 4 3 2 1
E.	Construct a packing shed.	5 4 3 2 1
21.	DEVELOP GOOD WORK HABITS AND ATTITUDES	
A.	Exhibit honesty and personal integrity.	5 4 3 2 1
B.	Follow employer's policies and procedures.	5 4 3 2 1
C.	Follow directions.	5 4 3 2 1
D.	Exhibit courtesy in dealing with customers and employer.	5 4 3 2 1
E.	Exhibit initiative for job.	5 4 3 2 1
F.	Be dependable and thorough in completing work.	5 4 3 2 1
G.	Accept and carry out responsibility.	5 4 3 2 1
H.	Be willing to learn.	5 4 3 2 1
I.	Exhibit harmonious working relationship with co-workers.	5 4 3 2 1
J.	Be clean, neat, and well-groomed in appearance.	5 4 3 2 1
K.	Show a positive attitude toward job.	5 4 3 2 1
L.	Have enthusiasm for job.	5 4 3 2 1
M.	Perform work assignments to the best of ability.	5 4 3 2 1
N.	Be punctual.	5 4 3 2 1
O.	Regular attendance.	5 4 3 2 1
P.	Be loyal to the employer.	5 4 3 2 1
Q.	Accept and profit from constructive criticism.	5 4 3 2 1
R.	Follow safety procedures and policies.	5 4 3 2 1
S.	Be flexible to change.	5 4 3 2 1
T.	Be willing to work overtime when needed.	5 4 3 2 1
U.	Advise management and other workers about existing safety hazards and work to correct them.	5 4 3 2 1
V.	See and anticipate the next task(s) which will contribute to success of the operation.	5 4 3 2 1

14

Kindly provide the following information about your farming operation.

Acres of producing apple land? _____

Acres of non-producing apple land? _____

Total Acreage _____

Approximate percent of apple crop used for fresh market? _____

Approximate percent of apple crop used for processing? _____

Number of year-round full-time employees? _____

Number of part-time employees (other than harvesting)? _____

Number of part-time harvesting employees? _____

end of survey — thank you very much

APPENDIX C

COVER LETTER

THE PENNSYLVANIA STATE UNIVERSITY
102 ARMSBY BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Agriculture
Department of Agricultural Education

Area Code 814
863-0443

February 8, 1982

Dear Adams County Apple Grower:

In order to improve the teaching of apple production, not only on the high school level but also in adult organizations, an attempt is being made to identify and rate competencies needed in the apple production industry. These competencies can then be incorporated directly into educational programs so that the student or adult can be better prepared to enter the apple production industry. Currently, there is little information and/or materials available that deal specifically with apple production. The information that is available deals primarily with fruit production as a whole, or is not applicable for teaching on the secondary level.

Enclosed you will find a survey listing specific competencies which you are asked to rate. The survey was designed so that it should take approximately 30 minutes to complete. Adams County was selected as the survey area because of the importance of apple production in the county. Adams County produces 45 percent of the apples in the state of Pennsylvania, and Pennsylvania ranks 4th nationwide. The information obtained from the survey will be analyzed as a pool of information and no individual grower will be singled out or analyzed. The code number on the survey sheet will be used only for follow-up purposes for those people who do not return their survey.

The final results of the survey will be published through The Pennsylvania State University in cooperation with the Pennsylvania Department of Education. This means that the information will be available not only in the state of Pennsylvania, but also nationwide. The information will be directly incorporated into Adams County vocational agriculture programs, and you, as participants, will also receive a copy of the final results.

Thank you for your time and interest.

Sincerely,

George W. Hamilton
Vocational Agriculture Instructor
Biglerville High School

GWH:dt

Enc. - 2

APPENDIX D

FOLLOW UP COVER LETTER

THE PENNSYLVANIA STATE UNIVERSITY
102 ARMSBY BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Agriculture
Department of Agricultural Education

Area Code 814
863-0443

March 17, 1982

Dear Adams County Apple Grower:

This letter is to follow-up on the survey form you should have received during the first part of February. Enclosed you will find a second survey listing specific competencies which you are asked to rate. The survey was designed so that it should take approximately 30 minutes to complete. The information obtained from the survey will be analyzed as a pool of information and no individual grower will be singled out to be analyzed. The code number on the survey sheet will be used only for follow-up purposes for this people who do not return their survey.

Currently, there is little information and/or materials available that deal specifically with apple production. The information that is available deals primarily with fruit production as a whole, or is not applicable for teaching at the secondary level nor for adults. This survey is being made to identify and rate competencies needed in the apple production industry. These competencies can then be incorporated directly into educational programs so that the student or adult can be better prepared to enter the apple industry.

The final results of the survey will be published through The Pennsylvania State University in cooperation with the Pennsylvania Department of Education. This means that the information will be available not only in the state of Pennsylvania, but also nationwide. The information will be directly incorporated into Adams County vocational agriculture programs, and you, as participants, will also receive a copy of the final results.

I must stress that in order for the study to be considered valid, all survey forms must be returned. If you have already returned your survey, please disregard this letter. If you have not yet returned the survey, please complete the enclosed survey form and return it at your earliest convenience.

Thank you for your time and interest.

Sincerely,

George W. Hamilton
Vocational Agriculture Instructor
Biglerville High School

GWH:dt

Enc. - 2